SPECIFICATION T-901. SEEDING

DESCRIPTION

901–1.1 This Work consists of soil preparation and seeding the areas shown on the Plans or as directed by the Engineer in accordance with these Specifications.

NOTE TO SPECIFIER:
Item T–902, Fertilizing, shall be included when fertilizing or liming are required for a specific project.

Wetlands Seeding shall consist of the furnishing and sowing of Seed Mixture No. 60 on areas of the right–of–way and easements which may be wet for extended periods of time.

Uplands Seeding shall consist of the furnishing and sowing of Seed Mixture No. 70 on slopes, appurtenances and other upland areas of the right–of–way having well–drained soils where dry, droughty conditions are likely to exist.

Temporary Seeding shall consist of the furnishing and sowing of a temporary seed mixture on the slopes and appurtenances of temporary embankments and other temporary sites.

Seeding for borrow pits and material disposal site should be measured and paid under this item. Seed mixture for borrow and disposal sites on the Airport will generally be the same mixture as specified for other areas. A special borrow pit mixture is available in the Highway Specifications, if appropriate.

MATERIALS

901–2.1 SEED. The species and application rates of grass, legume, and cover–crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Fed. Spec. JJJ–S–181 and these Specifications.

Provide seed conforming to the requirements of the Wisconsin Statutes and of the Wisconsin Administrative Code Chapter ATCP 20 regarding noxious weed seed content and labeling.

Do not use seed later than one year after the test date which appears on the label.

Seed shall be tested in accordance with the methods and procedures used for sampling and analyzing seed for purity, germination, and noxious weed seed content as prescribed by the current edition of Rules for Testing Seed, published by the Association of Official Seed Analysts.

Inoculate White Clover, Red Clover, Ladino Clover, Alsike Clover, Alfalfa, Empire Birdsfoot Trefoil and Crownvetch species. During inoculation, follow the instructions that ordinarily accompany such culture purchases. When the seed is applied according to Method B, treat seeds requiring inoculation with five times the amount of inoculant recommended in the instructions.

Avoid exposure of the culture or inoculated seed to the sunlight for more than ½ hour.

Store seed delivered prior to use to protect it from damage by heat, moisture, rodents or other causes. Discard and replace previously tested and accepted seed that is damaged.

Furnish seed separately or in mixtures in standard containers with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. Furnish the Engineer duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of date of delivery. Include in this statement:

- name and address of laboratory,
- date of test,
- lot number for each kind of seed,
- the results of tests as to name, percentages of purity and of germination,
- and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed.

Provide seed mixtures composed of seeds of the purity, germination, and proportions by weight given in the following Table 2, Table of Seed Mixtures. Provide seed species and varieties listed in Table 1.

Species and Acceptable Varieties. Where no variety is listed, there is no restriction on the variety furnished, provided the species is composed of pure live seed (PLS). PLS shall be grown in Wisconsin, northern Illinois, northeastern Iowa, or eastern Minnesota. PLS shall be packaged separately by species and clearly labeled.

TABLE 1. SPECIES AND ACCEPTABLE VARIETIES

Species Common Name	Species Botanical Name	Acceptable Varieties
Kentucky Bluegrass	Poa pratensis	
Red Fescue	Festuca rubra	Creeping
Hard Fescue	Festuca ovina var. duriuscula	Improved
Tall Fescue	Festuca arundinacea	Improved turf type
Salt Grass	Puccinella distans	Fult's
Redtop	Agrostis alba	
Timothy	Phleum pratense	
Little Bluestem*	Andropogon scoparius	
Sideoats Grama*	Bouteloua curtipendula	
Canada Wild Rye*	Elymus canadensis	
Perennial Rygrass	Lolium perenne	
Perennial Ryegrass	Lolium perenne	Improved Fine
Annual Ryegrass	Lolium multiflorum	
Alsike Clover	Trifolium hydridum	
Red Clover	Trifolium pratense	
White Clover	Trifolium repens	
Birdsfoot Trefoil	Lotus corniculatus	Empire
Japanese Millet	Echinochola crusgalli var. frumentacea	
Annual Oats	Avena sativa	
Alfalfa	Medicago sativa	
Bromegrass	Bromus inermis	
Orchardgrass	Dactylis glomerata	
Ladina Clover	Trifolium repens var. latum	Ladino
Agricultural Rye	Secale cereale	
Winter Wheat	Triticum aestivum	

*Pure Live Seed

TABLE 2. SEED MIXTURES

Species	*Purity Min. %*	*Germination Min %*	*Mixture Proportions, Percent*						
			No. 10	*No. 20*	*No. 30*	*No. 40*	*No. 50*	*No. 60*	*No.. 70*
Kentucky Bluegrass	85	80	40	6	10	35			
Red Fescue	97	85	25		30	20			
Hard Fescue	97	85		24	25	20			10
Tall Fescue	98	85		40					25
Salt Grass	98	85			10				
Redtop	92	85	5						
Timothy	98	90						12	
Little Bluestem	PLS*								15
Sideoats Grama	PLS*								15
Canada Wild Rye	PLS*							12	5
Perennial Ryegrass	97	90	20	30					30
Improved Fine Perennial Ryegrass	96	85			15	25			
Annual Ryegrass	97	90						35	
Alsike Clover	97	90						4	
Red Clover	98	90						4	
White Clover	95	90	10						
Birdsfoot Trefoil	95	80			10		100		
Japanese Millet	97	85						8	
Annual Oats	98	90						25	

*Substitute winter wheat for annual oats in fall plantings started after September 1.]

NOTE TO SPECIFIER:
If more than one type of seed mixture is bid, indicate the locations where the various mixtures are required.

Select the seed mixture or mixtures for use on the project in accordance with the following:

Seed Mixture No. 10 is intended for use on projects where average loam, heavy clay or moist soils predominate.

Seed Mixture No. 20 is intended for use on projects where light, dry, well–drained, sandy or gravelly soils predominate and shall be used for all high cut and fill slopes (generally exceeding six to eight feet), except where No. 70 is used.

Seed Mixture No. 10 or No. 20 shall be used on all ditches, inslopes, median areas and low fills, except where Seed Mixture No. 30 or No. 70 is used.

Seed Mixture No. 30 is intended for use on medians and on slopes or ditches generally within 15 feet of the shoulder where a salt–tolerant turf is desired.

Seed Mixture No. 40 shall be used in urban or other areas where a lawn type turf is desired.

Seed Mixture No. 50 is designed to produce in conjunction with Seed Mixture No. 20 a suitable ground cover on very steep slopes where sterile soil and erosive conditions preclude the establishment of normal turf. Seed Mixture No. 50 shall be used only on areas where ground cover is desired.

Seed Mixture No. 60 shall be used as a cover seeding for newly graded wet areas or as a nurse crop for specified wetland seed mixtures. Do not apply to inundated areas for the item of Seeding, Wetlands and shall be used only on areas designated in the contract or by the engineer.

Seed Mixture No. 70 shall be used for seeding slopes and upland areas having well drained soils the item of Seeding, Uplands and shall be used only on areas designated in the contract or by the engineer.

Due consideration must be given to longevity of plants, resistance to traffic and erosion, and attraction of birds or large animals. More than one seeding season may be specified, if appropriate. Local offices of the USDA Soil Conservation Service and the State University Agricultural Extension Service (County Agent or equivalent) shall be consulted for assistance and recommendations. These agencies shall also be consulted for liming and fertilizer recommendations.

901–2.2 TEMPORARY. Temporary seed mixture for use with the item of Temporary Seeding shall conform to the requirements for oats for spring and summer plantings and rye for fall plantings (after September 1).

TABLE 2. TEMPORARY SEED MIXTURE

Species	*Min. % Purity*	*Min. % Germination*
Annual Oats	98	90
Agricultural Rye	97	85
Winter Wheat	95	90

901–2.3 SOIL FOR REPAIRS. The soil for fill and topsoiling of areas to be repaired must be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil should be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and must be approved by the Engineer before being placed.

CONSTRUCTION METHODS

901–3.1 ADVANCE PREPARATION AND CLEANUP. After grading of areas has been completed and before applying fertilizer and ground limestone, rake or otherwise clear areas to be of stones (larger than 2 inches (50 mm) in any diameter), sticks, stumps, and other debris which might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass–covered areas. If damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, repair the damage. This Work includes filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded is considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of at least 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.
However, when the area to be seeded is sparsely sodded, weedy, barren, and unworked, or packed and hard, cut or satisfactorily dispose of grass and weeds, scarify the soil or otherwise loosen it to a depth of at least 5 inches (125 mm). Break clods and work the top 3 inches (75 mm) of soil into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901–3.2 SCHEDULING. Seeding, except Nos. 60 and 70 Mixtures, when not protected with a mulch cover, shall be done at a time of the year, except during midsummer, when temperature and moisture conditions are suitable for germination.

Seeding, except Nos. 60 and 70 Mixtures, when performed in conjunction with Mulching as specified in Specification T–908, may be done at any time when conditions are suitable for germination.

Seeding of Nos. 60 and 70 Mixtures may be done at any time during the growing season when soil conditions are suitable except between July 15 and October 15, unless otherwise permitted by the Engineer.

Seed Mixture No. 50 may be applied together with Seed Mixture No. 20, or be used to overseed mixture No. 20 when necessary.

Seeding shall be done with the selected seed mixture sown at the specified rate.

901–3.3 SOWING. Unless otherwise specified, seeds may be sown at the option of the Contractor, by either Method A or Method B described below.

Method A. Sow the selected seed mixture by means of equipment adapted to the purpose, or it may be scattered uniformly over the areas to be seeded, and lightly raked or dragged to cover the seed with approximately 1/4 inch of soil. After seeding, lightly roll the areas or compact it by means of suitable equipment, preferably of the cultipacker type when in the judgment of the Engineer the seedbed is either too loose or contains clods which would reduce the germination of the seed. Slopes steeper than three to one need not be rolled.

Scatter seed by hand with satisfactory hand seeders only, and only at such times when the air is sufficiently quiet to prevent seeds from blowing away.

Method B. Sow or spread the seed on the prepared seed bed by means of a stream or spray of water under pressure operated from an approved type of machine designed for that purpose. Place the selected seed mixture and water into a tank, provided within the machine, in sufficient quantities so that when the contents of the tank are sprayed on a given area the seed will be uniformly spread at the required rate of application. During the process, keep the contents of the tank stirred or agitated to provide uniform distribution of the seed. Empty the contents of the tank within 2 hours after the seed is added to the tank. Discard seed that is allowed to remain mixed with the water for longer than 2 hours. Dragging or rolling will not be required.

901–3.4 SEEDING RATES. The sowing rate for seeds, in pounds per 1,000 square feet of area, shall be as follows:

Seed Mixture No. 10 at 1–1/2 pounds
Seed Mixture No. 20 at 3 pounds
Seed Mixture No. 30 at 2 pounds
Seed Mixture No. 40 at 2 pounds
Seed Mixture No. 50 at 1/2 pound
Seed Mixture No. 60 at 1–1/2 pounds (equivalent)
Seed Mixture No. 70 at 3 pounds (equivalent)
Temporary Seeding at 3 pounds

Determine the actual seeding rate for Seed Mixture No. 60 and Seed Mixture No. 70 by multiplying the equivalent rate of seeding for each of these mixtures by the sum of the unadjusted and adjusted percentages of the various species in the seed mixtures as sown.

The unadjusted percentage is the minimum percent of purity and germination specified in the Table of Seed Mixtures for the applicable species.

Obtain the adjusted percentage for each of the PLS species by dividing the specified percentage of such species by the product of the percent of purity and the percent of germination for each of the PLS species as delivered.

901–3.5 MAINTENANCE OF SEEDED AREAS. Protect seeded areas against traffic or other use by warning signs or barricades, as approved by the Engineer. Repair surfaces gullied or otherwise damaged following seeding by regrading and reseeding as directed. Mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the Work.

When either application method outlined above is used for Work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the Engineer. If, at the time when the Contract has been otherwise completed, it is not possible to make an adequate determination of the color, density, and uniformity of such stand of grass, payment for the unaccepted portions of the areas seeded out of season will be withheld until such time as these requirements have been met.

METHOD OF MEASUREMENT

901–4.1 Seeding and Temporary Seeding will be measured by the pound. The quantity to be measured for payment will be the actual number of pounds of seed furnished and sown in accordance with the Contract, within the limits of such Work designated on the Plans or as ordered by the Engineer. Measurement will be based on net weights of seed shipments or on quantities weighed on approved scales furnished by the Contractor.

Deductions will be made for quantities which are wasted or are not actually incorporated in the Work in accordance with the Contract.

BASIS OF PAYMENT

901–5.1 SEEDING. This Pay Item, measured as provided above, will be paid for at the Contract unit price per pound for Seeding for the mixture specified, which will be full compensation for furnishing, handling and storing all seed; for furnishing the required culture and inoculating seed as specified; for preparing the seed bed, sowing, covering and firming the seed; and for all labor, tools, equipment and incidentals necessary to complete the Work.

Standard Pay Items for Work covered by this Specification are as follows:

Pay Item T90101	Seeding, Mixture No. 10, per pound
Pay Item T90102	Seeding, Mixture No. 20, per pound
Pay Item T90103	Seeding, Mixture No. 30, per pound
Pay Item T90104	Seeding, Mixture No. 40, per pound
Pay Item T90105	Seeding, Mixture No. 50, per pound
Pay Item T90106	Seeding, Mixture No. 60, per pound
Pay Item T90107	Seeding, Mixture No. 70, per pound

Measurement and Payment will be made only for Items included in the Schedule of Prices. The cost of all Work required by the Contract Documents shall be included in the Pay Items contained in the Schedule of Prices.

MATERIAL REQUIREMENTS

Fed. Spec. JJJ–S–181B	Agricultural Seeds

SPECIFICATION T–902. FERTILIZING

DESCRIPTION

902–1.1 DESCRIPTION. Fertilizing, Type A or Type B, consists of furnishing and incorporating fertilizing material in the soil on areas to be seeded or in the surface of areas to be sodded, in accordance with the requirements of the Specifications.

Agricultural Limestone Treatment consists of furnishing and incorporating agricultural limestone in the soil on areas shown on the Plans or designated in the Contract, or as ordered by the Engineer, in accordance with the requirements of the Specifications.

MATERIALS

902–2.1 FERTILIZERS. Fertilizers intended for use in connection with seeding, sodding, or other planting shall be standard, commercial, packaged or bulk products in granular or liquid form conforming to the requirements of the Wisconsin Statutes and of the Wisconsin Administrative Code Chapter Agriculture 17. Each container of packaged fertilizer shall be plainly marked with the analysis of the contents showing minimum percentages of total nitrogen, available phosphoric acid and soluble potash. When the fertilizer is furnished in bulk, each shipment shall be accompanied by an invoice indicating the minimum percentages of total nitrogen, available phosphoric acid and soluble potash in the contents.

When fertilizer having a sum of nitrogen, phosphoric acid and potash greater than 32 percent for Type A or 50 percent for Type B is used, apply it at a rate which will provide an equivalent amount of nitrogen, phosphoric acid and potash.

Type A. Type A fertilizer shall meet the following minimum requirements:

Nitrogen, not less than 16%
Phosphoric Acid, not less than 6%
Potash, not less than.....6%

The sum of nitrogen, phosphoric acid and potash shall be not less than 32 percent.

Total nitrogen shall be not less than the sum of the phosphoric acid and soluble potash.

Type B. Type B fertilizer shall meet the following minimum requirements:

Nitrogen, not less than ..... 16 percent
Phosphoric Acid, not less than ..... 6 percent
Potash, not less than..... 24 percent

Sum of nitrogen, phosphoric acid and potash shall be not less than 50 percent.

902–2.2 AGRICULTURAL LIMESTONE. Agricultural limestone shall be limestone conforming to the requirements of Chapter 94.66 of the Wisconsin Statutes and of the Wisconsin Administrative Code Chapter Agriculture 28. Furnished limestone shall have a neutralizing index of not less than 40 or more than 109.

Furnish a statement indicating the index zone or grade of the limestone for each deposit prior to use.

CONSTRUCTION METHODS

902–3.1 FERTILIZER. Uniformly apply the fertilizer selected for the seeding areas and incorporate it in the soil by light discing or harrowing. Granular fertilizer should be well pulverized and free from lumps when applied.

When fertilizer is incorporated with topsoiled areas, the fertilizer may be applied just prior to and in conjunction with the final discing or harrowing operations of the topsoil, or in the event the topsoil is manipulated by hand, just prior to the final raking and leveling.

In the event fertilizer is to be placed on surfaces on which no topsoil is placed, prepare the soil by discing or harrowing to a depth of 5 inches and then incorporate the fertilizer as specified.

In the event fertilizer is to be placed on seeding areas where the seed is to be sown by means of a spray or stream of water under pressure, the required amount of fertilizer may be placed in the tank, mixed together with the water and the seed, and constantly agitated and applied in the seeding operation. Fertilizer applied by this method will not require discing and harrowing after being placed.

When the fertilizing of areas to be sodded is required, uniformly spread the fertilizer over the soil prior to sodding at the rate specified below. Work the fertilizer into the soil as the soil is loosened and prepared.

Apply Type A Fertilizer containing a 32 percent sum total of nitrogen, phosphoric acid and potash at 7 pounds per 1,000 square feet of area, unless otherwise specified in the Contract. Determine the application rate for Type A fertilizer containing a greater percentage of these components by dividing 224 by the greater percentage.

Apply Type B Fertilizer containing a 50 percent sum total of nitrogen, phosphoric acid and potash at 7 pounds per 1,000 square feet of area, unless otherwise specified in the Contract. Determine the application rate for Type B fertilizer containing a greater percentage of these components by dividing 350 by the greater percentage.

902–3.2 AGRICULTURAL LIMESTONE TREATMENT. Uniformly spread agricultural limestone over the designated areas at the rate specified in the following table for the index zone of the limestone proposed for use, unless otherwise specified in the Contract.

TABLE 1. AGRICULTURAL LIMESTONE TREATMENT

	Application Rates per 1000 Square Feet						
Index Zones	40–49	50–59	60–69	70–79	80–89	90–99	100–109
Pounds	140	120	100	90	80	70	60

For convenience in checking the required rate of application, the materials used may be measured on a volumetric basis, providing the conversion from weight to volume is determined from representative samples of the materials used.

Incorporate agricultural limestone in the soils in the designated areas in conjunction with the required fertilizers. Apply the limestone in accordance with the pertinent construction requirements applicable to fertilizers.

METHOD OF MEASUREMENT

902–4.1 METHOD OF MEASUREMENT. Fertilizer will be measured by the hundred pounds (cwt.) based on an application rate of 7 pounds per 1,000 square feet and 32 percent required fertilizer components for Type A and 50 percent of such components for Type B. The quantity to be measured for payment will be the amount of such material furnished and incorporated in the Work in accordance with the Contract. The quantity to be measured for payment shall be the number of hundred–weight (cwt.) of material determined by multiplying the actual number of cwt. of material incorporated by the ratio of the actual percentage of fertilizer components used to 32 percent for Type A and to 50 percent for Type B.

Agricultural Limestone Treatment will be measured by the ton (2,000 pounds), based on an application rate of 100 pounds per 1,000 square feet and an index zone of 60–69. The quantity to be measured for payment shall be the number of tons of material determined by multiplying the actual number of tons of material incorporated by 100 and dividing by the application rate required for the index zone of the material used.

BASIS OF PAYMENT

902–5.1 BASIS OF PAYMENT. Fertilizer, measured as provided above, will be paid for at the Contract unit price per hundred–weight (cwt.) for Fertilizer, Type A, or Fertilizer, Type B, which price will be full compensation for furnishing, hauling, placing and incorporating in the Work; and for all labor, materials, equipment, tools and incidentals necessary to complete the Work.

Agricultural Limestone Treatment, measured as provided above, will be paid for at the Contract unit price per ton for said Pay Item, which price will be full compensation for furnishing, hauling, placing and incorporating the required materials in the soil; and for all labor, equipment, tools and incidentals necessary to complete the Work.

Standard Pay Items for Work covered by this Specification are as follows:

Pay Item T90201	Fertilizing, Type A, per cwt.
Pay Item T90202	Fertilizing, Type B, per cwt.
Pay Item T90203	Agricultural Limestone Treatment, per ton

Measurement and payment will be made only for Pay Items included in the Schedule of Prices. The cost of all Work required by the Contract Documents shall be included in the Pay Items contained in the Schedule of Prices.

SPECIFICATION T–904. SODDING

DESCRIPTION

904–1.1 This Work consists of furnishing and laying live sod on prepared areas shown on the Plans, including construction of sod ditch checks or similar applications as shown on the Plans, or as directed by the Engineer.

Watering Sodded Areas consists of furnishing and applying water to sodded areas.

MATERIALS

904–2.1 SOD. The sod shall consist of a dense, well–rooted growth of permanent and desirable grasses, indigenous to the general locality where it is to be used, and shall be practically free from weeds or undesirable grasses. At the time the sod is cut, the grass on the sod shall have a length of approximately 2 inches (if longer, the grass shall be cut to approximately this length) and the sod shall have been raked free from debris.

Cut the sod in uniform commercial sized strips.

Sod thickness shall be as uniform as possible, 3/4 inch minimum, depending on the nature of the sod. The entire dense root system of the grasses shall be retained, but shall be exposed in the sod strip. The sod shall remain intact throughout installation without tearing or breaking.

Do not cut sod unless the moisture content is at a value that will eliminate crumbling or breaking during cutting operations. Water sod, if necessary, at least 12 hours prior to cutting, to achieve optimum moisture content for cutting.

904–2.2 LIME. Lime, when included, shall be in accordance with the requirements of Specification T–902.

904–2.3 FERTILIZER. Fertilizer, when included, shall be in accordance with the requirements of Specification T–902.

904–2.4 WATER. Water shall be sufficiently free from oil, acid, alkali, salt, or other harmful materials that would inhibit the growth of grass. It shall be subject to the approval of the Engineer prior to use.

904–2.5 SOIL FOR REPAIRS. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the Engineer before being placed.

CONSTRUCTION METHODS

904–3.1 GENERAL. Areas to be solid, strip, or spot sodded shall be indicated on the Plans. Have on hand suitable equipment necessary for proper preparation of the ground surface and for the handling and placing of required materials.

NOTE TO SPECIFIER:
The location of all areas to be sodded, including ditch check and strips, should be indicated on the Plans or on a sodding schedule on the Plans.

904–3.2 PREPARING THE GROUND SURFACE. After grading has been completed and before applying fertilizer and limestone, areas to be sodded must be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris which might interfere with sodding, growth of grasses, or subsequent maintenance of grass–covered areas. If damage by erosion or other causes occurs after grading of areas and before beginning the application of fertilizer and ground limestone, repair the damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

904–3.3 APPLYING FERTILIZER AND AGRICULTURAL LIMESTONE. Following ground surface preparation, uniformly spread fertilizer and agricultural limestone at a rate which will provide at least the minimum quantity of each fertilizer ingredient.

904–3.4 OBTAINING AND DELIVERING SOD. Transplant the sod within 24 hours from the time it is stripped, unless circumstances beyond the Contractor's control make storing necessary. In these cases, stack sod, keep it moist, and protect it from exposure to the air and sun and from freezing. Cut and move sod only when the soil moisture conditions are such that favorable results can be expected. Where the soil is too dry, permission to cut sod may be granted only after it has been watered sufficiently to moisten the soil to the depth the sod is to be cut.

904–3.5 LAYING SOD. Sod only during the seasons when satisfactory results can be expected. Do not use frozen sod and do not place sod upon frozen soil. Sod may be transplanted during periods of drought with the approval of the Engineer, provided the sod bed is watered to moisten the soil to a depth of at least 4 inches (100 mm) immediately prior to laying the sod.

The sod should be moist and placed on a moist earth bed. Do not use pitch forks to handle sod, and dumping from vehicles is not be permitted. Carefully place the sod by hand, edge to edge and with staggered joints, in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward. Immediately press the sod into contact with the sod bed by tamping or rolling with approved equipment to provide a true and even surface, and insure knitting without displacement of the sod or deformation of the surfaces of sodded areas. Where the sod may be displaced during sodding operations, work from ladders or treaded planks when replacing it, to prevent further displacement. Use good quality screened soil to fill all cracks between sods. The quantity of the fill soil should not cause smothering of the grass. Where the grades are such that the flow of water will be from paved surfaces across sodded areas, set the surface of the soil in the sod after compaction approximately 1 inch (25 mm) below the pavement edge. Where the flow will be over the sodded areas and onto the paved surfaces around manholes and inlets, place the surface of the sod after compaction flush with pavement edges.

904–3.6 STAKING AND CLEANUP. On all slopes steeper than one foot vertical to 4 feet horizontal stake or peg the sod with pieces of plasterers' lath or stakes, 12 inches (305 mm) in length, spaced as required by the nature of the soil and steepness of slope, from 18 to 36 inches (460 mm to 0.91 m) apart along the longitudinal axis of the sod strip. Place stakes near the top edge of the sod strip and driven approximately plumb through the sod leaving about 1/2 inch (13 mm) of the peg above the sod.

Stake sod placed in ditches, flumes or other appurtenances, where a concentrated flow of water may be expected, regardless of the slope.

After the staking has been completed clear the surface of loose sod, excess soil or other foreign material.

904–3.7 WATERING. Adequate water and watering equipment must be on hand before sodding begins. Keep the sod moist until it has become established and its continued growth is assured. Water sodded areas for a minimum of 10 days. In all cases, water in a manner that will avoid erosion from the application of excessive quantities and that will avoid damage to the finished surface.

904–3.8 ESTABLISHING TURF.

a. General. Provide and continue general care for the sodded areas as soon as the sod has been laid and until final inspection and acceptance of the Work.

b. Protection. Protect sodded areas against traffic or other use by warning signs or barricades.

c. Mowing. Mow the sodded areas with approved mowing equipment, depending upon climatic and growth conditions and the needs for mowing specific areas. In the event that weeds or other undesirable vegetation are permitted to grow to such an extent that, either cut or uncut, they threaten to smother the sodded species, they shall be mowed and the clippings raked and removed from the area.

904–3.9 REPAIRING. When the surface has become disturbed or damaged during the period covered by this Contract, repair the affected areas to re–establish the grade and the condition of the soil to the originally specified condition and resod the affected area.

METHOD OF MEASUREMENT

904–4.1 Sodding will be measured by the square yard and the quantity to be measured for payment under this Pay Item will be the actual number of square yards of area on which sod or reinforced sod has been placed in accordance with the Contract, within the limits of such construction designated on the Plans or as directed by the Engineer.

Watering Sodded Areas will be measured by volume in gallons, and the quantity to be measured for payment shall be the amount of water furnished and applied in accordance with the Contract or as directed by the Engineer. The volume will be determined by approved meters or from tanks of known capacity.

BASIS OF PAYMENT

904–5.1 Sodding, measured as provided above, will be paid for at the Contract unit price per square yard for Sodding, which price shall be full compensation for preparing the earth bed; for furnishing, placing, staking, rolling and watering the sod; and for all labor, equipment, tools and incidentals necessary to complete the work in accordance with the Contract.

Watering sodded areas, measured as provided above, will be paid for at the Contract unit price per gallon, which price shall be full compensation for furnishing, hauling and applying the water; and for all labor, materials, equipment, tools and incidentals necessary to complete the Work.

When the Contract does not contain a Pay Item for Watering Sodded Areas, then the furnishing and application of water over sodded areas will be considered incidental to Sodding, and measurement or separate payment will not be made.

Standard Pay Items for Work covered by the Specification are as follows:

Pay Item T90401	Sodding, per square yard
Pay Item T90402	Watering Sodded Areas, per gallon

Measurement and payment will be made only for Pay Items included in the Schedule of Prices. The cost of all Work required by the Contract Documents shall be included in the Pay Items contained in the Schedule of Prices.

SPECIFICATION T–905. TOPSOIL AND SALVAGED TOPSOIL

DESCRIPTION

905–1.1 TOPSOIL. This Work consists of furnishing humus–bearing soil, adapted to the sustenance of plant life and commonly known as topsoil, from locations off–site furnished by the Contractor, and placing, spreading, and finishing of topsoil, as shown on the Plans, or directed by the Engineer.

905–1.2 SALVAGED TOPSOIL. This Work consists of removal of topsoil from the sites of proposed excavations and embankments in quantities necessary to cover the Work, including reclamation, placing, spreading, and finishing of topsoil, as shown on the Plans, or directed by the Engineer.

MATERIALS

905–2.1 TOPSOIL. Topsoil shall be the surface layer of soil with no admixture of refuse or material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (2 inches or more in diameter), clay lumps or similar objects. Brush shall be cut, removed, and disposed of at locations provided by Contractor. Do not remove ordinary sods and herbaceous growth such as grass and weeds but thoroughly break up and intermix it with the soil during handling operations. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the association of official agricultural chemists in effect on the date of Advertisement for Bids. The organic content shall be not less than 3 percent nor more than 20 percent as determined by the wet–combustion method (chromic acid reduction). There shall be not less than 20 percent nor more than 80 percent of the material passing the 200 mesh (0.075 mm) sieve as determined by the wash test in accordance with ASTM C 117.

Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.

Thirty days prior to placing topsoil, notify the Engineer of the source of topsoil to be furnished by the Contractor. Inspect topsoil to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths, for testing purposes as specified.

905–2.2 SALVAGED TOPSOIL. Salvaged topsoil should consist of the natural loam, sandy loam, silt loam, silty clay loam or clay loam humus–bearing soils available from the original surface of the areas to be excavated for construction of proposed improvements.

CONSTRUCTION METHODS

905–3.1 GENERAL. Areas to be topsoiled shall be shown on the Plans. If topsoil is available on the site beyond the normal construction limits, the location of the stockpiles or areas to be stripped of topsoil and the stripping depths shall be shown on the Plans.

Have on hand suitable equipment necessary for proper preparation and treatment of the ground surface, for stripping of topsoil, and for the handling and placing of all required materials, in good condition before the various operations are started.

905–3.2 PREPARING THE GROUND SURFACE. Immediately prior to dumping and spreading the topsoil, loosen the surface by discs or spike–tooth harrows, or by other means approved by the Engineer, to a minimum depth of 2 inches (50 mm) to facilitate bonding of the topsoil to the covered subgrade soil. Clear the surface of the area to be topsoiled of all stones larger than 2 inches (50 mm) in diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Areas that are too compact to respond to these operations shall receive special scarification.

Undercut or underfill areas designated to be covered with topsoil to a degree that when covered to the required depth with topsoil, the finished Work will be in accordance with the required lines, grades, slopes, and cross–sections. Grade areas to drain. Do not leave low places or pockets where water will not immediately drain away.

This Work shall be considered subsidiary to the Pay Items of Topsoil or Salvaged Topsoil and no additional compensation will be made, nor will allowance be made for undercut or underfill for placement of topsoil in the final measurement for quantities of the classes of Excavation.

905–3.3 OBTAINING TOPSOIL. Prior to the stripping of topsoil from designated areas, remove vegetation, briars, stumps and large roots, rubbish or stones found on these areas, which interfere with subsequent operations. Remove heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means.

When suitable topsoil is available on the site, remove this material from the designated areas and to the depth shown on the Plans or as necessary to provide sufficient volumes to cover the areas designated on the Plans to the depths specified. Spread the topsoil on areas already

tilled and smooth–graded, or stockpiled in areas approved by the Engineer. Topsoil salvaged and stockpiled by the Contractor shall be rehandled and placed without additional compensation. Remove and replace topsoil that has been stockpiled on the site by others, and is required for topsoiling purposes. Grade, if required, the sites of all stockpiles and adjacent areas that have been disturbed and put into a condition acceptable for seeding.

Dispose of volumes of Salvaged Topsoil excavated in excess of the quantities required to complete the Work according to the Plans with no additional compensation. In the case of Salvaged Topsoil, deductions from Excavation Pay Items shall be made at the applicable Contract unit prices for the volume of fill required to backfill the voids resulting from excess topsoil removed.

When suitable topsoil is secured off the Airport site, locate and obtain the supply, subject to the approval of the Engineer. Notify the Engineer sufficiently in advance of operations in order that necessary measurements and tests can be made. Haul topsoil to the site of the Work and place it for spreading, or spread as required. Rehandle and place topsoil hauled to the site of the Work and stockpiled without additional compensation.

905–3.4 PLACING TOPSOIL. Spread the topsoil on the prepared areas to a uniform depth of 4 inches (100 mm) after compaction, unless otherwise shown on the Plans or stated in the Special Provisions. Do not spread when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the Work. Spread topsoil so that turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, break all large, stiff clods and hard lumps with a pulverizer or by other effective means, and rake up and dispose of stones or rocks (2 inches (50 mm) or more in diameter), roots, litter, or any foreign matter. After spreading is completed, compact the topsoil by rolling with a cultipacker or by other means approved by the Engineer. The compacted topsoil surface must conform to the required lines, grades, and cross sections. Promptly remove topsoil or other dirt falling upon pavements.

METHOD OF MEASUREMENT

905–4.1 Topsoil will be measured by the square yard or cubic yard as provided in the Contract. Topsoil paid by the cubic yard will be measured in its original position. Topsoil volume will be computed by the method of end areas. When approved by the Engineer, topsoil may be measured by cubic yards in the vehicle.

When measured by the square yard, the quantity to be measured for payment is the actual number of square yards of area topsoiled to the depth specified within the limits of construction designated on the Plans or in the Contract or as direct by the Engineer.

905–4.2 SALVAGED TOPSOIL. Salvaged Topsoil will be measured by the square yard, and the quantity measured for payment under this Pay Item will be the actual number of square yards of area topsoiled to the depth specified within the limits of construction designated on the Plans or in the Contract or as directed by the Engineer.

BASIS OF PAYMENT

905–5.1 TOPSOIL. Topsoil, measured as provided above, will be paid for at the Contract unit price per square yard or per cubic yard for Topsoil, which price will be full compensation for furnishing, excavating, loading, hauling, and placing of this material; for undercutting of excavations or underfilling of embankments necessary to receive this material; and for furnishing all labor, material, equipment, tools and incidentals necessary to complete the Work.

905–5.2 SALVAGED TOPSOIL. Salvaged Topsoil, measured as provided above, will be paid for at the Contract unit price per square yard for Salvaged Topsoil, which price will be full compensation for removing, stockpiling, reclaiming, hauling and placing this material; and for furnishing all labor, equipment, tools, and incidentals necessary to complete the Work. However, no deductions will be made from Pay Items of Excavation for the quantities of Salvaged Topsoil material that may be obtained from areas in cut sections, nor will the volumes of Salvaged Topsoil removed from sites of proposed embankments be measured for payment or paid for under Excavation Pay Items. There will be no allowance, adjustment, or measurement for payment under the pertinent Excavation Pay Items for undercutting of cut sections or underfilling of embankments as hereinbefore prescribed under preparation for topsoiling.

Payment will be made at the Contract unit price per cubic yard for Topsoil (obtained off the site). This price will be full compensation for furnishing all materials and for all preparation, placing, and spreading of the materials, and for all labor, equipment, tools, and incidentals necessary to complete the Work.

Standard Pay Items for Work covered by this Specification are as follows:

Pay Item T90501	Topsoil, per cubic yard
Pay Item T90502	Topsoil, per square yard
Pay Item T90503	Salvaged Topsoil, per square yard

Measurement and payment will only be made for Items included in the Schedule of Prices. The cost of all Work required by the Contract Documents shall be included in the Pay Items contained in the Schedule of Prices.

MATERIAL REQUIREMENTS

ASTM C 117	Test Method for Materials Finer than 75–mm (No. 200) Sieve in Mineral Aggregates by Washing

SPECIFICATION T–908. MULCHING

DESCRIPTION

908–1.1 This Work consists of furnishing, hauling, placing, and securing mulch on surfaces indicated on the Plans or designated by the Engineer.

MATERIALS

908–2.1 MULCH MATERIAL. Mulching material shall consist of straw or hay in an air dry condition or wood excelsior fiber, wood chips or other suitable material of a similar nature, which is free of noxious weed seeds and objectionable foreign matter. Mulch materials, which contain matured seed of species which would volunteer and be detrimental to proposed overseeding, or to surrounding farm land, will not be acceptable. Straw or other mulch material which is fresh, excessively brittle, or which is in such an advanced stage of decomposition as to smother or retard the planted grass, will not be acceptable.

a. Hay. Hay shall be native hay, sudan grass hay, broomsedge hay, legume hay, or similar hay or grass clippings.

b. Straw. Straw shall be the threshed plant residue of oats, wheat, barley, rye, or rice from which grain has been removed.

c. Manufactured Mulch. Cellulose–fiber or wood–pulp mulch shall be products commercially available for use in spray applications.

908–2.2 INSPECTION. Thirty days prior to application, notify the Engineer of sources and quantities of mulch materials available and furnish representative samples of the materials to be used. These samples may be used as standards with the approval of the Engineer and all materials brought on the site which do not meet these standards will be rejected.

CONSTRUCTION METHODS

908–3.1 MULCHING. Place mulch on a given area within 3 days after the seeding has been completed.

Do not place mulch during periods of high winds that would blow mulch from its original position.

Place mulch loosely or openly enough to allow sunlight to penetrate and air to circulate, but thickly enough to shade the ground, conserve soil moisture and prevent or reduce erosion.

Maintain mulched areas and repair areas damaged by wind, erosion, traffic, fire or other causes prior to final or partial acceptance of Work under the Contract.

Before spreading mulch, remove large clods, stumps, stones, brush, roots, and other foreign material from the area to be mulched. Apply mulch immediately after seeding. Spread mulch by hand methods, blower, or other mechanical methods, to provide a uniform covering.

Furnish mulch material and haul it, and evenly apply it on the area shown on the plans or designated by the Engineer. Spread straw or hay over the surface to a uniform thickness at the rate of 1–1/2 to 3 tons per acre (1350–2700 kg per acre) to provide a loose depth of not less than 1/2 inches (13 mm) nor more than 2 inches (50 mm). Mulch may be blown on the slopes and the use of cutters in the equipment for this purpose is permitted to the extent that at least 95 percent of the mulch in place on the slope is 6 inches (150 mm) or more in length. When mulches applied by the blowing method are cut, the loose depth in place shall be not less than 1 inch (25 mm) nor more than 2 inches (50 mm).

908–3.2 SECURING MULCH. Immediately after spreading, anchor mulch in the soil by the use of a mulch tiller consisting of a series of dull, flat discs with notched edges. The discs should be approximately 20 inches in diameter and spaced at about 8–inch centers. Equip the tiller with a ballast compartment to permit adjustment of the weight for depth control.

Press mulch into the soil to a depth of approximately 1–1/2 to 2–1/2 inches (40–60 mm) in one pass of the tiller traveling longitudinally. Do not operate mulch tillers on slopes so steep that damage to the mulch, seedbed, or soil occurs. Anchor the mulch on these areas by the use of an approved netting securely pegged or stapled in place. In lieu of this anchorage, the "peg and string" method may be used. Approved erosion control blankets or mats may be used in lieu of separate applications of mulch and netting. Equip and operate tractors to minimize the disturbance or displacement of the soil. More than one pass of the tiller may be required to assure adequate anchoring of the mulch.

If the "peg and string" method is used, secure the mulch by the use of wooden stakes driven into the ground on 5–foot (1.5 m) centers (both ways) or less. String binder twine between adjacent stakes in straight lines and crisscrossed diagonally over the mulch. Next, firmly drive the stakes nearly flush to the ground to draw the twine down tight onto the mulch.

908–3.3 CARE AND REPAIR.

a. Care for the mulched areas until final acceptance of the project. Care should consist of providing protection against traffic or other use by placing warning signs, and erecting barricades that may be shown on the Plans before or immediately after mulching has been completed on the designated areas.

b. Repair or replace mulching that is defective or becomes damaged until the project is finally accepted. When, in the judgment of the Engineer, such defects or damages are the result of poor workmanship or failure to meet the requirements of the Specifications, the cost of the necessary repairs or replacement shall be borne by the Contractor. However, once mulching has been completed in accordance with the provisions of the Contract, no additional Work at Contractor's expense will be required, but subsequent repairs and replacements deemed necessary by the Engineer shall be made by the Contractor and will be paid for as Extra Work.

METHOD OF MEASUREMENT

908–4.1 Mulching will be measured by the square yard or by the ton as provided in the Contract.

When measured by the square yard, the quantity to be measured for payment will be the number of square yards of surface area on which the mulch has been placed and accepted in accordance with the Contract.

When measured by the ton, the quantity to be measured for payment will be the number of tons of mulch furnished, placed, and accepted in accordance with the Contract.

BASIS OF PAYMENT

908–5.1 The quantity, measured as provided above, will be paid for at the Contract unit price per square yard or per ton for Mulching, which price will be full compensation for furnishing all materials; for all hauling, treating, placing, spreading, and anchoring of the mulch material; for maintenance of the Work and repair of damaged areas; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the Work.

Standard Pay Items for Work covered by this Specification are as follows:

Pay Item T90801	Mulching, per square yard
Pay Item T90802	Mulching, per ton

Measurement and payment will only be made for Pay Items included in the Schedule of Prices. The cost of all Work required by the Contract Documents shall be included in the Pay Items contained in the Schedule of Prices.